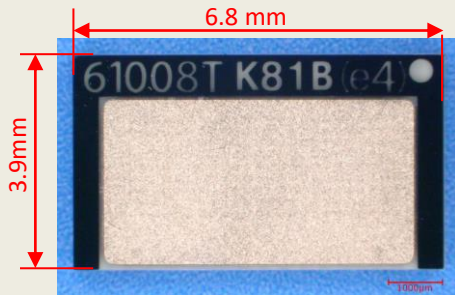
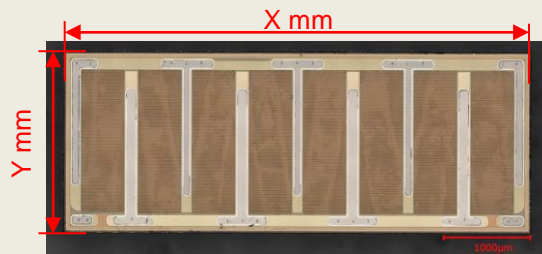


GaN SYSTEMS 100V GaN TRANSISTOR (GS61008T-E01-MR) STRUCTURE and PROCESS ANALYSIS REPORTS

Dec 2019. LTEC Corporation released detailed structure and process analysis reports of GaN Systems GaN power transistor (GS61008T-E01-MR)



Package



Die image

Product overview

"GS61008T" is a normally-off GaN-on-Si power transistor with maximum operating voltage $V_{ds} = 100V$ and high current $I_{ds} = 90A$ made by GaN Systems. GaN Systems GS61008T offers the lowest input gate capacitance comparing to EPC GaN and Infineon Si-OPTIMOS transistors. And it is targeted for high current and ultra-short LIDAR pulsed applications.

Summary of the analysis results

- Lateral GaN HEMT (High Electron Mobility Transistor) realizes normally-off operation.
- The complex GaN-Epi layer structure.
- The breakdown voltage of the transistor is $BV_{dss} \sim 144V$ based on the measurement result
- The effective process technology node is extracted from the trench pitch and contact opening that are the minimum processing dimensions regarding the manufacturing process technology.

Report abstract

- The structural analysis report clarifies the details of GaN Systems' GaN power transistor "GS61008T-E01-MR", includes package appearance, X-ray observation, die plane analysis (wiring connection, layout), die cross section analysis (GaN transistor, die edge), GaN-Epi layer TEM-EDX analysis and electrical characteristics measurement (I_d - V_d , BV_{dss} , capacitance).
- The process flow analysis report estimates the chip manufacturing process based on the results of the structural analysis, includes estimation of process flow, number of masks, cross section of process sequence and the discussion of the relationship between electrical characteristics and physical structure.

Contact LTEC Corporation for the current price as it decreases over time

19G-0016-1,2

Table of Contents

Structure Analysis Report

	Page
<u>Device summary</u>	
Table 1, Executive Summary	3
<u>Analysis result summary</u>	4
Table 2. Device structure	5
Table 3. Device cross section	6
<u>Package analysis</u>	
Package overview	8
X-ray observation	10
<u>Plane view analysis</u>	
Plane view (optical microscope)	11
Plane view, Scanning Electron Microscope (SEM)	23
<u>Cross section analysis (SEM)</u>	
Die thickness	26
Cross section of GaN transistor	27
Cross section of die edge	37
<u>Cross section analysis (TEM)</u>	
GaN-Epi, Metal layer	42
<u>TEM EDX analysis</u>	
GaN-Epi, Metal layer	48
<u>Electrical characteristic</u>	
I_{ds} - V_{ds} (on mode)	62
I_d - V_{gs}	63
Leakage current (off mode)	64
Break down voltage	65
Cap- V_{ds}	66

Table of Contents

Process Analysis Report

	Page
Executive summary	3
Device structure	5
Discussion device structure and process flow	9
<u>Analysis summary</u>	
Table 3. Die structure	15
Table 4. Each layer material and thickness	16
<u>Process flow</u>	
Front end wafer process flow (estimation)	17
Process sequence cross section	18
<u>Electric characteristic</u>	
Comparison with other makers' GaN FET (Data sheet)	23
On-state Id-Vds	24
Id-Vgs	25
Off-state leakage current	26
Breakdown voltage	29
Cap-Vds	30
Relation between physical structure and electrical characteristic: Ron	31
<u>Appendix</u>	
Reference papers list	33

